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Amperometric DNA biosensor for the determination of auto-antibodies using DNA interaction with Pt(II) complex

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Abstract

A method of denatured DNA immobilisation on cellulose nitrate film has been developed. A modified film of uniform and stable surface has been used as a bio-sensitive part of amperometric DNA biosensor based on the stationary mercury-film covered silver electrode. The biosensor has been used to devise a new variant of solid-phase immunoassay of auto-antibodies (Ab) in blood serum without separation of components. The content of auto-Ab was monitored by measuring the currents of catalytic hydrogen evolution (with potentials of -1.2 and -1.4V) resulting from the complexing of Pt(II) with DNA or auto-Ab respectively. The determination has been performed within a wide concentration area of 5.0×10-10 to 7.0×10-8M. The limit of detection is 3.0×10-10M. The affinity constants for the immunoreaction of DNA-antibodies have been found to be 1.25×10 9 and 2.50×108M-1, which confirms the specificity of the interaction. The protocol of the immunoassay has been proposed and the procedure of diagnosing Aleutian mink disease (AMD) has been described here.

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Keywords

Amperometric biosensor, Auto-antibodies, DNA, Immunoassay, Platinum complexing